CLAIMS

WHAT IS CLAIMED IS:

1. A charge pump circuit, comprising:

a replica circuit that provides a current difference between charge (UP) and discharge (DN) currents; and

a buffer coupled to the replica circuit to buffer a received control voltage.

2. A charge pump circuit for use in a phase-lock loop circuit, the charge pump circuit comprising;

a charge pump core circuit that outputs a control voltage;

a replica circuit that is coupled to the charge pump core circuit, wherein the replica circuit receives the control voltage and produces one or more bias signals that are coupled to the charge pump core circuit to minimize the difference between charge up and charge down currents generated by the charge pump core circuit.

3. The charge pump circuit of claim 2, further comprising a buffer circuit that is coupled to receive the control voltage and output the control voltage to the replica circuit.

4. The charge pump circuit of claim 3, further comprising one or more error amplifiers that are coupled to the replica circuit and the buffer circuit, the one or more error amplifiers operate to output the one or more bias signals.

5. The charge pump circuit of claim 2, further comprising:

a servo circuit coupled to the replica circuit to receive at least one bias signal; and

a driver circuit coupled between the servo circuit and the charge pump core circuit.

6. A method for operating a charge pump circuit in a phase-lock loop circuit, the method comprising:

generating an output control voltage at a charge pump core circuit;

generating one or more bias signals based on the control voltage; and

adjusting the operation of the core circuit based on the one or more bias signals so as to minimize a difference between charge up and charge down currents.

7. The method of claim 6, wherein the step of generating the one or more bias signals comprises:

receiving the control voltage at a buffer circuit that outputs a version of the control voltage;

receiving the version of the control voltage at a replica circuit that generates the one or more bias signals based on the control voltage.

8. The method of claim 7, further comprising:

generating a current difference based on the version of the control voltage; and

generating the one or more bias signals based on the current difference.

9. A charge pump circuit for use in a phase-lock loop circuit, the charge pump circuit comprising;

a charge pump core circuit means for outputting a control voltage;

a replica circuit means for receiving the control voltage and producing one or more bias signals that are coupled to the charge pump core circuit means to minimize the difference between charge up and charge down currents generated by the charge pump core circuit means.

10. The charge pump circuit of claim 9, further comprising a buffer circuit means for receiving the control voltage and outputting a version of the control voltage to the replica circuit means.

11. The charge pump circuit of claim 10, further comprising one or more error amplifiers means for receiving the version of the control voltage and outputting the one or more bias signals.

12. The charge pump circuit of claim 9, further comprising:

a servo circuit means for receiving the at least one bias signal; and

a driver circuit means coupled to the servo circuit means.